

Patent Application of Ross C Willoughby and Edward W Sheehan for  
"Laminated Tube for the Transport of Gas-Phase Ions or Charged Particles"

continued

Page 31

**Abstract:** An improved tube for accepting gas-phase ions and particles contained in a gas by allowing substantially all the gas-phase ions and gas from an ion source at or greater than atmospheric pressure to flow into the tube and be transferred to a lower pressure region. Transport and motion of the ions through the tube is determined by a combination of viscous forces exerted on the ions by the flowing gas molecules and electrostatic forces causing the motion of the ions through the tube and away from the walls of the tube. More specifically, the tube is made up of stratified elements, wherein DC potentials are applied to the elements so that the DC voltage on any element determines the electric potential experience by the ions as they pass through the tube. A precise electrical gradient is maintained along the length of the stratified tube to insure the transport of the ions. Embodiments of this invention are methods and devices for improving the sensitivity of mass spectrometry or ion mobility spectrometers when coupled to atmospheric and above atmospheric pressure ionization sources. An alternate embodiment of this invention applies an AC voltage to one or more of the conducting elements in the laminate.